

## **Influence of Vibration Amplitude on Reaction Time and Drowsiness Level**

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**Abstract :** It is well established that exposure to vibration has an adverse effect on human health, comfort, and performance. However, there is little quantitative knowledge on performance combined with drowsiness level during vibration exposure. This paper reports a study investigating the influence of vibration amplitude on seated occupant reaction time and drowsiness level. Eighteen male volunteers were recruited for this experiment. Before commencing the experiment, total transmitted acceleration measured at interfaces between the seat pan and seatback to human body was adjusted to become 0.2 ms<sup>-2</sup> r.m.s and 0.4 ms<sup>-2</sup> r.m.s for each volunteer. Seated volunteers were exposed to Gaussian random vibration with frequency band 1-15 Hz at two level of amplitude (low vibration amplitude and medium vibration amplitude) for 20-minutes in separate days. For the purpose of drowsiness measurement, volunteers were asked to complete 10-minutes PVT test before and after vibration exposure and rate their subjective drowsiness by giving score using Karolinska Sleepiness Scale (KSS) before vibration, every 5-minutes interval and following 20-minutes of vibration exposure. Strong evidence of drowsiness was found as there was a significant increase in reaction time and number of lapse following exposure to vibration in both conditions. However, the effect is more apparent in medium vibration amplitude. A steady increase of drowsiness level can also be observed in KSS in all volunteers. However, no significant differences were found in KSS between low vibration amplitude and medium vibration amplitude. It is concluded that exposure to vibration has an adverse effect on human alertness level and more pronounced at higher vibration amplitude. Taken together, these findings suggest a role of vibration in promoting drowsiness, especially at higher vibration amplitude.

**Keywords :** drowsiness, human vibration, karolinska sleepiness scale, psychomotor vigilance test

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